

United States Department of Agriculture,

DIVISION OF AGROSTOLOGY.

[Grass and Forage Plant Investigation.]

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NEW SPECIES OF NORTH AMERICAN GRASSES.

In the present circular are brought together the descriptions of a number of new species of grasses, mostly belonging to the genus *Poa*, from the western part of the United States. This form of issuing descriptions is adopted to expedite publication and to allow the citation of names in non-technical publications where new descriptions can not well be given.

1. **POA CAPILLARIFOLIA** Scribn. & Williams, sp. nov.

A smooth, caespitose perennial, 2-4.5 dm. high, with long, thread-like leaves, marcescent basal sheaths and narrow greenish panicle, about 4 or 5 cm. long. Culm with the short, basal internodes usually much exceeded by the sheaths. Leaves soft, 1-2 dm. in length, abundantly produced from numerous intravaginal innovations. Sheaths smooth, striate, the basal ones swollen, membranous, and persistent. Panicle narrowly ovate, or oblong in outline, closely flowered, lower branches solitary or in twos, or more rarely in threes, the lower ones from 1½-3 cm. in length; spikelets 3-4-flowered, 5-6 mm. long; empty glumes unequal, scabrous on the back, 3-nerved, scarious-margined, the lower one broadly lanceolate, acute, 2½ mm. long, the upper obtuse, 3 mm. long, both often erose-dentate above; flowering glumes thin, 5-nerved, broadly ovate, obtuse or acutish, minutely hispid on the back above and on the keel and nerves, with broad hyaline margins and usually erose-dentate apex, about 3½ mm. in length. The palet nearly or quite equaling the flowering glume, hyaline, with distinct greenish ciliate-hispid keels and erose-dentate apex.

Type specimen No. 2614, Geo. Hansen, California.

Allied to *Poa cusickii* Vasey, but with smaller flowers, longer and more filiform leaves and smaller, closer panicle. In some ways this species is intermediate between *P. cusickii* Vasey and *P. idahoensis* Beal.

POA VASEYCHLOA Scribn., new name. *P. pulchella* Vasey (1882), not Salisb. nor Parl.

POA NUDATA Scribn., new name. *Poa capillaris* Scribn. (1898), not Linn.

2. **POA SAXATILIS** Scribn. & Williams, sp. nov.

A slender, closely caespitose perennial, 2½-3½ dm., tall, with soft, smooth leaves and stems and lax, variegated panicles from 5-7 cm. long. Culms erect or somewhat geniculate below, very smooth, with conspicuous purplish nodes. Leaves flat, rather obtusely pointed, those of the stem from 1½-2 cm. or more in length; those of the sterile shoots about twice as long. Sheaths smooth, or basal ones sparsely pubescent, striate, shorter than the internodes, the lower ones swollen and often split open by the growth of the intravaginal shoots. Ligule 2-3 mm. long, acute. Panicle branches ascending, filiform and somewhat flexuous, usually in twos, the lower ones about 4 cm. long, flower-bearing above the middle. Spikelets compressed, lanceolate, 3-5-flowered, 6-9 mm. long. Empty glumes somewhat unequal, obtuse, or sub-acute, 3-nerved, smooth, about 4 mm. long. Flowering glume obscurely

5-nerved, oblong, obtuse or subacute, minutely scabrous on the back, sparsely pubescent at the base, more densely pubescent on the keel and marginal nerves, green below, purplish above with rather broad, scarious, erose-dentate margins, 4-4½ mm. long. Palet nearly equaling the flowering glume, ciliate on the keels, apex bidentate.

Type specimen No. 1964, C. V. Piper, dry rocky places, Mt. Rainier, Washington, August 1895. Altitude 2100 meters.

This species has been most frequently referred to *Poa gracillima* Vasey, but differs in its more densely caespitose habit, shorter, flatter leaves, more closely-flowered panicle, larger spikelets and flowers, and in the firmer texture of the flowering glumes.

3. POA LECKENBYI Scribner, sp. nov.

A pale green, tufted perennial, about 7½ dm. high, with long, slender leaves, somewhat inflated, persistent basal sheaths and pale rather narrow panicle about 1½ dm. long. Culms smooth, frequently rooted at the basal nodes. Leaves glaucous green, smooth below, rough above and on the margins, acute; sheaths smooth, all except the uppermost exceeding the internodes, the lower ones membranous; ligule about 6 mm. long, acute, or often fimbriately divided, decurrent. Panicle branches erect, flower-bearing nearly or quite to the base, the longer ones about 5 cm. in length. Spikelets compressed, oblong-lanceolate, 5-6-flowered, 9-11 mm. long. Empty glumes subequal, 3-nerved, rough-hispid on the nerves, rather narrowly lanceolate, acute or acuminate, 7 mm long, slightly exceeding the lower flowering glumes. Flowering glumes ovate-oblong, 5-nerved, 5-6 mm. long, scarious-margined and often erose-dentate above, hispidulous on the upper and pubescent on the lower half, pubescence most abundant on the keel and marginal nerves. Palet shorter than the flowering glume, 2-keeled, conspicuously ciliate-pubescent on the keels and minutely pubescent below between the keels, narrowed above to an erose-ciliate apex.

Type specimen from Scott, Klickitat County, Washington, June 5, 1898, collected by A. B. Leckenby for whom the species is named. The grass grows in very sandy soil and is an excellent sand binder. It has something the appearance of *Poa nevadensis* Vasey, but may be easily distinguished by its inflated membranous sheaths, larger flowers, and pubescent flowering glumes, which are much less firm in texture.

4. POA BREVIPANICULATA Scribn. & Williams, sp. nov.

An erect, rather rigid, caespitose grass, 1½-3 dm. high, from short, stout rhizomes, with a short, broad, closely-flowered, greenish or purplish panicle. Culms smoothish or somewhat roughened below the panicle; lower internodes short, exceeded by the sheaths. Leaves flat or more often conduplicate, smooth below, rough above and on the margins; cauline leaves 2-3, short, the upper usually reduced to a mucro, the ligule short-truncate, often reduced to a narrow band; leaves of the sterile shoots longer, 1 dm. or more in length, acute with rigid points, ligule obsolete; basal sheaths persistent. Spikelets compressed, 4-6-flowered, 4-6 mm. long, ovate-lanceolate, rather acute. Empty glumes unequal, hispid on the keel and more or less scabrous on the back; the lower narrowly lanceolate, acuminate, 1-nerved; the upper broader, acute, 3-nerved, 3½ mm. long. Flowering glumes broadly ovate, obtuse or acutish, strongly pubescent on the lower half of the keel and marginal nerves, minutely scabrous above on the back or sometimes hispidulous, intermediate nerves obsolete, 3½-4 mm. long; palet hyaline with green, hispid-pubescent keels, apex bidentate.

Type specimen No. 554, G. F. Breninger, Table Rock, Colorado, May 25, 1891. Meadows. Altitude 2200 meters.

Tall forms of this species approach *Poa longepedunculata* Scribn., but may be distinguished by the smaller size, stout rootstocks, very short lower internodes, broader panicle, denser pubescence on the flowering glumes and more rigid appearance. It also approaches forms of *Poa eatoni* S. Wats., but differs in its shorter, broader panicle, shorter basal internodes and fewer-flowered spikelets. Like the following species it has usually been referred to *Poa fendleriana*. Its range extends from Colorado to New Mexico and Arizona.

5. **POA LONGILIGULA** Scribn. & Williams, sp. nov.

A caespitose glaucous perennial, 4 or 5 dm. high, with rather harsh culms and leaves abundantly produced from short rhizomes, persistent basal sheaths and rather crowded panicles of large, shining, green or purplish spikelets. Leaves of the sterile shoots erect or spreading, usually $1\frac{1}{2}$ to $2\frac{1}{2}$ dm. long, flat or conduplicate, with a conspicuous, decurrent ligule; cauline leaves shorter, with longer ligules (5-7 mm.), the upper one sometimes reduced to a mere mucro; leaves all rather rigid and mucronate-pointed. Panicle ovate in outline, erect or rarely somewhat nodding, $\frac{3}{4}$ to $1\frac{1}{4}$ dm. long, lower branches seldom exceeding $2\frac{1}{2}$ cm. Spikelets compressed, ovate-lanceolate, rather acute, 4-6-flowered, 6-10 mm. long. Empty glumes unequal, more or less rough-hispid on the back; the lower lanceolate, acute or acuminate, 1-nerved, $4\frac{1}{2}$ mm. long, the upper much broader, 3-nerved, 5 mm. long. Flowering glumes ovate-oblong, rather obtuse, 5-nerved, the intermediate nerves inconspicuous, more or less scabrous above on the back, woolly pubescent on the lower half of the keel and marginal nerves, with broad hyaline margins, usually erose-dentate above, 4- $5\frac{1}{2}$ mm. long; palea much shorter than the flowering glume, hyaline, with green, hispid-pubescent keels.

Type specimen No. 5149, Marcus E. Jones, Silver Reef, Utah, May 3, 1894. Altitude, 1,200 meters.

This species has been referred to *Poa fendleriana* (Steud.) Vasey, from which it is easily distinguished by its coarser growth, harsh stems and leaves, much longer decurrent ligule, conspicuous on the leaves of both sterile shoots and culms, larger spikelets and flowers, and denser pubescence of the flowering glumes.

Sclerochloa californica Munro, in Bentham's Pl. Hartweg. (without description), to which specimens of both this and the preceding species have been referred, is a very different plant and is also distinct from *Poa fendleriana*. It is represented in the National Herbarium by Hartweg's No. 2035 and Brewer's No. 1122, both from California, which agree exactly with the type of *Poa secunda* Presl. in the herbarium of the Missouri Botanical Garden.

Poa longiligula ranges from southwestern South Dakota to Southern Colorado, Arizona, and Oregon.

6. **POA PLANIFOLIA** Scribn. & Williams, sp. nov.

An erect, loosely spreading, glaucous perennial, about 6 dm. high, from short rhizomes, with rather long, flat, abruptly pointed leaves and an open, subpyramidal panicle 1-2 dm. long. Culm smooth, except just below the nodes, where it is minutely roughened. Sheaths striate, somewhat keeled, more or less rough on the keel, otherwise smooth; leaves flat, glaucous, smooth below, roughened above, especially on the margins, $1\frac{1}{2}$ to 2 dm. long; ligule obtuse or truncate, about 2 mm. long. Panicle branches in 3's or 5's, scabrous, spreading, the lower 5-10 cm. long, flower-bearing along the upper half.

Spikelets compressed, ovate-lanceolate, acute, 3-4 flowered. Empty glumes ovate, obtuse or acutish, 3-nerved, scabrous on the back, subequal, about 4 mm. long; flowering glumes oblong-ovate, obtuse, 5-nerved, puberulent on the back, conspicuously pubescent on the lower half of the keel and marginal nerves, and more or less pubescent on the intermediate nerves, scarious-margined above, 3-4 mm. long; palet nearly or quite equaling the flowering glume, rather narrow, tapering above to a narrow truncate, more or less irregularly fringed apex, the prominent green keels hispid-pubescent. Grain pointed below, narrowed above, and bearing three minute, whitish tubercles on the summit.

Type specimen No. 2814, Thos. A. Williams, moist banks, Spring Creek, in the Big Horn Basin, Wyoming, August 4, 1897. Altitude, 1,500 meters.

This species has been confused with *Poa lucida* Vasey, from which it differs more particularly in habit of growth and in the longer, flat, glaucous leaves, stems rough below the nodes, and conspicuously pubescent nerves of the flowering glumes, which are glabrous between the nerves.

Its range as indicated by specimens in the U. S. National Herbarium extends from southwestern South Dakota to central Wyoming and north to central Montana.

7. *POA ACUTIGLUMIS* Scribner, sp. nov.

A loosely tufted perennial about 6 dm. high, with rather short radical leaves and pale green or purplish panicle about 1 dm. in length. Culm smooth or somewhat roughened at the nodes and just below the panicle. Cauline leaves 2-3, minutely roughened on both the upper and lower surfaces. Sheaths smooth or somewhat roughened above, striate, shorter than the internodes. Ligule about 5 mm. long, acute, often more or less fimbriately divided, rough-hispid on the back. Panicle ovate in outline, acute at both ends, branches in twos or threes, rough-hispid, ascending, the lower longer ones about 5 cm. in length. Spikelets lanceolate, acute, remotely 4-6-flowered, 8-11 mm. long; empty glumes unequal, rough-hispid on the back, the lower long-acuminate, 3-nerved, the upper lanceolate, acute or acuminate, more or less distinctly 5-nerved, 5-6 mm. long; flowering glumes rather conspicuously 5-nerved, narrowly oblong-lanceolate, acute, rough-hispid, on the back, with a short, crisp pubescence at the base and on the lower half of the nerves, about 5 mm. long. Palet a little shorter than the flowering glume, oblong-linear, acute, conspicuously ciliate on the keels and sparsely pubescent near the base between them.

Type specimen collected by Thos. Howell at Grave Creek, Oregon, May 21, 1884. A very distinct species, apparently without any very near relatives.

8. *POA TENERRIMA* Scribn., sp. nov.

A very slender, caespitose perennial, 3-5 dm. high with short, filiform leaves and spreading capillary panicles, 7-9 cm. long. Leaves of the intravaginal innovations 4-8 cm. long, thread-like; those of the culm 3-5 cm. long, the uppermost usually about 4 mm., involute, filiform, at least when dry, smooth. Panicle branches in twos and threes, or solitary above, minutely scabrous, flower-bearing only near the tips; spikelets 3-4-flowered, about 7 mm. long, florets rather remote on a slender rachilla; empty glumes lanceolate, acute, the first about 2.5 mm. long, the second a little longer and broader than the first. Flowering glumes about 4 mm. long, oblong, obtuse, 5-nerved, perfectly smooth excepting for a short, crisp pubescence near the base. Palet nearly as long as the glume, 2-keeled, 2-toothed at the apex, keels ciliate, excepting near the base.

Type specimen from California without special locality or collectors named. A striking species, remarkable for the short, filiform leaves and rather few-flowered capillary panicles. The spikelets in the specimen in hand are purplish, as is the culm, and the plants appear to be staminate.

9. **POA LIMOSA** Scribn. & Williams, sp. nov.

An erect, robust, glaucous perennial, 7 or 8 dm. high, from a rhizomatous base, with broad, flat leaves and narrow, closely flowered panicle 1-1½ dm. long. Culm smooth. Culm-leaves 2 or 3, 4-10 cm. long, those of the sterile shoots 10 to 20 cm. or more long, all flat (rarely conduplicate), smooth except on the margins, and abruptly pointed; sheaths smooth, conspicuously striate, all except the lowermost much shorter than the internodes; ligule about 5 mm. long, acute or acuminate, often fimbriate, rough-hispid on the back. Panicle-branches scabrous, erect (or sometimes spreading during anthesis), the lower ones about 4 or 5 cm. in length. Spikelets compressed, lanceolate, 4-5-flowered, about 6 mm. long; empty glumes unequal, smooth or slightly rough on the back, the lower lanceolate, acute, indistinctly 3-nerved, a little less than 3 mm. long, the upper ovate-lanceolate, rather obtuse or subacute, strongly 3-nerved, slightly exceeding 3 mm. in length; flowering glume conspicuously 5-nerved, oblong-ovate, obtuse, minutely scabrous on the back and rough-hispid on the nerves, 3½ mm. long; palea about equaling the flowering glume, sometimes slightly exceeding it, ciliate on the keels, bidentate at the apex.

Type specimen collected by H. N. Bolander, at Mono Lake, California, evidently growing in wet boggy soil, but no notes as to habitat accompany the specimen. Specimens collected by Bolander, No. 6114, and with no locality other than "California," belong to this species.

The species is related to *Poa nevadensis* Vasey and is apparently confined to the Pacific Slope.

10. **POA EPILIS** Scribn., sp. nov.

A rather slender, erect, closely caespitose perennial, 4-6 dm. high, with numerous basal leaves from intravaginal shoots, and contracted, closely flowered, green, bronze-brown or purplish, usually somewhat nodding panicles about 5 cm. long. Culm smooth, composed of about three internodes, the lowest short, the other two long and much exceeding their sheaths. Leaves smooth, slender, acute, flat, or convolute when dry, those of the sterile shoots much the longest, often 2 dm. or more in length. Sheaths smooth, striate. Ligules of the cauline leaves acute, about 3 mm. long, those of the sterile shoots obtuse, often reduced to a narrow band. Panicle branches erect or ascending, smooth, the longer ones more or less flexuous, simple and flower-bearing near the top or sometimes branched and flower-bearing nearly to the base, seldom over 3 cm. long. Spikelets somewhat compressed, ovate-lanceolate, 3-4-flowered, about 5 mm. long. Empty glumes smooth, unequal, the lower lanceolate or ovate-lanceolate, acute or acuminate, 1-nerved, 2½ mm. long, the upper broadly ovate, acute, 3-nerved, about 3 mm. long; flowering glumes 5-nerved, rough-hispid on the back, the roughness most conspicuous on the keel and marginal nerves, oblong-elliptical, obtuse, about 4 mm. long; palea a little shorter than the flowering glume, ciliate on the keels, apex bidentate. Grain pale, ellipsoid, rather acute at both ends, with a conspicuous white tubercle at the apex.

Type specimen No. 1457, Shear and Bessey, open places, thin, moist timberland, Buffalo Pass, Colorado, August 13, 1898. Altitude, 3,000 to 3,500 meters.

Plants belonging to this species have usually been referred to *Poa cuspidata* Vasey, but the type of that species belongs to *Poa wheeleri* Vasey, from which *Poa epilis* differ in its smooth sheaths, contracted panicles and abundantly produced intravaginal shoots.

Poa epilis ranges from central Colorado to northeast Wyoming and central Montana, and occurs in the mountains at rather high altitudes.

11. **POA INCURVA** Scribn. & Williams, sp. nov.

A slender, closely caespitose perennial about 2 dm. high, from strong fibrous roots, with purplish flexuous stems, rather rigid flexuously recurved leaves and small, purplish panicles 2-4 cm. long. Culm smooth. Culm-leaves about 2, smooth below, minutely hispidulous above and at the acute apex, convolute, 1-3 cm. long; sheaths smooth, striate, shorter than the internodes; ligule acute, often irregularly fimbriate, 1-2 mm. long. Leaves of the sterile shoots much longer than those of the culm, recurved-flexuous, otherwise similar; basal sheaths persistent. Panicle few-flowered, flexuous, the branches mostly solitary, minutely scabrous, flower-bearing at the outer extremities. Spikelets compressed, purplish, loosely 2-3-flowered, about 5 mm. long; empty glumes unequal, the lower oblong-lanceolate, subacute, indistinctly 3-nerved, slightly more than 2 mm. long, the upper broadly ovate, obtuse or subacute, distinctly 3-nerved, usually a little more than 3 mm. long; flowering glume rounded on the back, indistinctly 5-nerved, ovate, obtuse or subacute, smoothish above, densely pubescent below, the pubescence strongest on the middle and marginal nerves, purple on the back, rather broadly scarious-margined above, about 4 mm. long; palea nearly or quite equaling the flowering glumes, strongly 2-keeled, ciliate on the keels, apex bidentate.

Type specimen No. 1989, C. V. Piper, Morain of Duckaloose Glacier, Olympic Mountains, Washington, August, 1895. Altitude, 2,100 meters.

Allied to *Poa sandbergii* Vasey but distinguished by its flexuous stems, smaller spikelets, and smoother, convolute, recurved-flexuous leaves.

12. **POA INVAGINATA** Scribn. & Williams, sp. nov.

A smooth, caespitose erect or somewhat decumbent perennial, about 4 dm. high, with numerous intravaginal shoots, marcescent sheaths and pale, open panicles 10-12 cm. long. Leaves mostly flat, rather narrow, acute, smooth or the margins minutely hispidulous near the base; sheaths smooth, striate; ligule acute, decurrent, 4-5 mm. long, alike on leaves of both culms and sterile shoots. Panicle subpyramidal to oblong, the branches usually in threes or fives, filiform, flexuous, scabrous, flower-bearing along the upper half, the longer ones seldom exceeding 5 cm. in length; spikelets compressed, lanceolate, rather loosely 2-4-flowered, 6-7 mm. long; empty glumes 3-nerved, narrowly oblong to oblong-ovate, obtuse or subacute, the lower 3-4 mm., the upper 4-5 mm. long; flowering glumes keeled, oblong ovate, obtuse or subacute, 5-nerved, minutely scabrous above, pubescent below on the nerves and sometimes sparsely pubescent between them, 4-5 mm. long; palea shorter than the flowering glume, ciliate on the keels, apex erose-dentate.

Type specimen in Herb. Scribn., No. 20, Calif. Acad. Sciences, collected at "Summit Camp, Sierra Nevada," July 10, 1870.

It has been collected by C. F. Sonne at Dormer Lake, Calif., July 4, 1892 (No. 17) and at Mt. Stanford, Calif., August, 1888 (No. 24), and also by W. N. Suksdorf at Mitchells Point, Wasco Co., Oregon, May, 1884 (No. 107a).

This species has been confused with *Poa gracillima* Vasey and *Poa cusickii* Vasey but may be easily distinguished from the former by its coarser habit, flat leaves, larger and more abundantly flowered panicle, larger spikelets and longer, more conspicuously nerved flowering glumes, and from the latter by its broader, flat leaves and pubescent flowering glumes.

13. **ERAGROSTIS LUTESCENS** Scribn., sp. nov.

A low, much branched and densely caespitose annual, 1-2 dm. high, with rather short, flat leaves, and narrow, pale green or straw-colored panicles, 4-7 cm. long. Culms glabrous. Sheaths loose or somewhat inflated, striate and glabrous, or with a few short hairs at the throat; ligule very short, ciliate; leaf-blade 2-5 cm. long, 2-3 mm wide, minutely scabrous above, very acute. Panicle branches ascending or appressed, naked below. Spikelets narrowly oblong, 2-3 mm. long, about 1.5 mm. broad, 3 to many- (usually 10-12) flowered. The empty glumes unequal, the first about 1 mm. long, the second one-third longer and larger; flowering glumes obtuse, about 2 mm. long, distinctly 3-nerved.

This species is allied to *Eragrostis purshii*, but is more densely caespitose and is at once distinguished by its narrow, yellowish-green panicles.

Type specimens from sandy banks of Snake River, Almota, Washington, collected by C. V. Piper, July 7, 1897, No. 2624. Number 4729 Prof. L. F. Henderson found growing in sandy, moderately dry ground along the Platte River, Platte, Southern Idaho, August 1, 1897, belongs to this species.

14. **ELYMUS ARENICOLUS** Scribn. & Smith, sp. nov.

A stout, erect, glaucous perennial, about 1 m. high, with numerous, tough, creeping rootstocks. Culms terete, glabrous, 8-15 dm. high; nodes glabrous. Sheaths striate, smooth, or the upper ones minutely strigose-pubescent, nearly as long as the nodes and closely enveloping them; ligule coarsely fimbriate, about 1 mm. long. Blades rigid, deeply furrowed on both sides, smooth or very minutely strigose-pubescent on the back, strongly scabrous-pubescent on the nerves, scabrous along the margins, 2-4 mm. wide, 2-3 dm. long, strongly involute and pungently pointed. Spike rather slender, subflexuous, 1.5-2.5 dm. long, interrupted below; rachis compressed, sparsely hirsute along the margins and densely hirsute at the nodes. Spikelets single or in pairs, lanceolate, compressed, about 6-flowered; empty glumes subulate, or narrowly lanceolate, rigid, scabrous or sparsely hispid above, slightly unequal, 7-10 mm. long, about half or less than half the length of the spikelet. Flowering glumes rounded on the back, obliquely lanceolate, acute, sparsely hirsute, especially toward the base, 5-nerved, mucronate- or sometimes awn-pointed, the lowest about 10 mm. long. Palea a little shorter than its glume, scarious along the margins, hispid scabrous on the keels, obtuse or emarginate at the apex.

Type collected by A. B. Leckenby, at Suferts, Oregon, November 26, 1898. Growing in the sand dunes along the Columbia River.

Other specimens examined are Nos. 466 and 468 Sandberg and Leiberg, Washington, 1893; No. 1176 Suksdorf, Rockland, Klickitat Co., Washington, June 3, 1890.

It differs from *Elymus flavescens*, with which it has been previously confounded, in the narrowly lanceolate flowering glumes, which are less densely pubescent. Like *Elymus flavescens* it grows on the dryest sand dunes and is an excellent sand binder. The bases of the culms are clothed with dead leaf sheaths.

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Approved:
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WASHINGTON, D. C., February 15, 1899.